United States Patent [19]

Howell

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[54] **CLONED CAULIFLOWER MOSAIC VIRUS DNA AS A PLANT VEHICLE**

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[51] **Int. Cl.**[3] **C12N 15/00;** C12N 5/00; C12N 1/00

[52] **U.S. Cl.** ..... **435/172;** 435/240; 435/317; 47/1 R; 47/DIG. 1

[58] **Field of Search** 435/172, 235, 317, 240

[56] **References Cited**

PUBLICATIONS

Franck et al., Cell vol. 21, pp. 285–294 (1980).
Shepherd, Ann. Rev. Plant Physiol vol. 30, pp. 405–423 (1979).
Szeto et al., Science vol. 196, pp. 210–212 (1977).
Meagher et al., Vinology vol. 80, pp. 362–375 (1977).
Howell et al., Science vol. 208, pp. 1265–1267 (Jun. 13, 1980).

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[57] **ABSTRACT**

Novel methods and compositions are provided for preparing vectors for the introduction of DNA into plant cells for transcription and expression of the DNA. Particularly, cauliflower mosaic virus DNA is inserted into a bacterial cloning vehicle to provide a recombinant plasmid for cloning in a microorganism. The resulting cloned plasmid is genetically manipulated to introduce exogenous or heterologous DNA. Conveniently, linkers can be inserted which provide for a unique restriction site for insertion of exogenous or heterologous DNA. At each stage the modified plasmid may be cloned to provide for relatively large amounts of material for modification and isolation. Besides insertions, deletions may be made, removing non-essential portions of the virus. After completion of the viral modifications, the CaMV is excised from the hybrid plasmid by restriction enzyme cleavage and may be used for systemic infection of plants.

10 Claims, 4 Drawing Figures